Identification of Emissions Sources for Pinal County

Technical Advisory Meeting
May 18, 2006

DKS Associates
TRANSPORTATION SOLUTIONS

Agenda

- Introductions
- Presentation and Discussion of Work Completed Since Last TAC Meeting
- Review of and Comment on Final Products
- Next (Final) Steps

Presentation and Discussion of Work Completed Since Last TAC Meeting

- Task 3 Prepare and Analyze Emissions Estimates: Ozone and PM_{10} Analysis
- Task 5 Prepare PM_{10} Attainment Plan Blueprint
- Task 6 Evaluate Unpaved Road Treatment Control Efficiency

Task 3 Prepare and Analyze Emissions Estimates: Ozone and PM_{10} Analysis

Completed

- Prepared report on Ozone analysis
- Incorporated received comments into PM_{10} spreadsheet tool and user manual
- Prepared analysis of control efficiency and cost-effectiveness of unpaved road control measures

Remaining

- Respond to comments on reports

Task 5 Prepare PM 10 Attainment Plan Blueprint

Completed

- Evaluated current EPA attainment planning requirements
- Completed final analysis of Pinal County PM_{10} air quality data
- Completed review of PM_{10} forecasting models used in other serious non-attainment areas
- Completed evaluation of forecasting models under development
- Drafted Blueprint report

Task 5 Prepare PM 10 Attainment Plan Blueprint

Remaining

- Respond to comments on report

Task 6 Evaluate Unpaved Road Treatment Control Efficiency

Completed

- Emission data collection from treated and untreated sections of unpaved roads
- Analysis of unpaved road treatment control efficiency

Remaining

- Respond to comments on report

Review of and Comment on Final Products

New Products

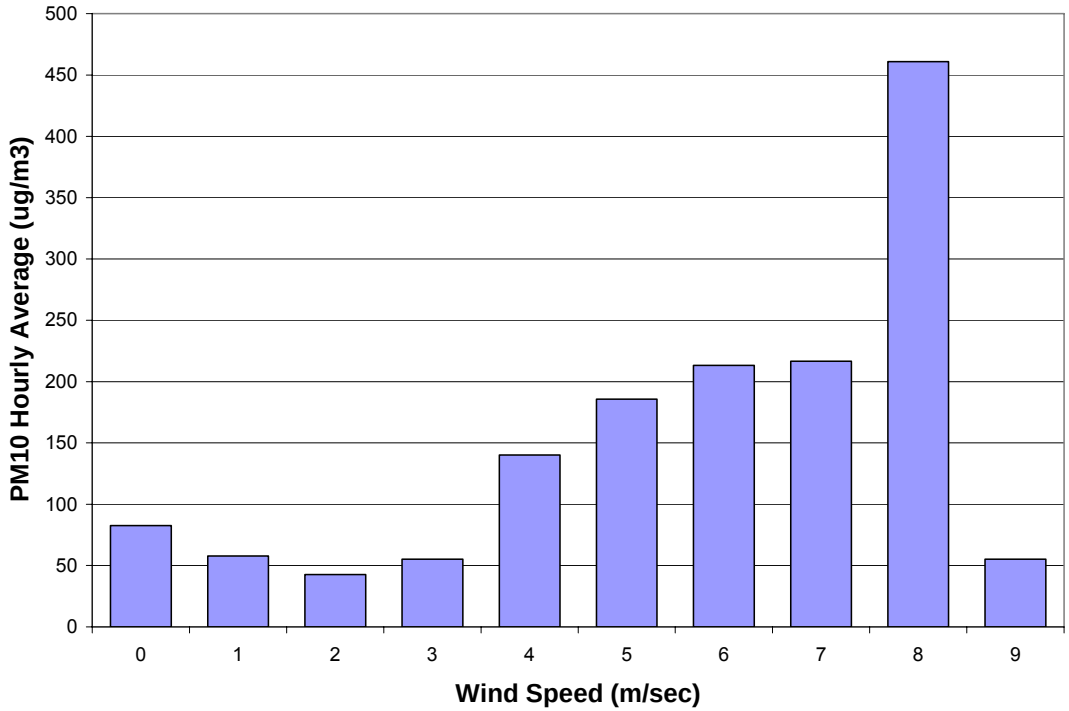
- Blueprint for Development of PM_{10} Attainment Plan
- Measurements of PM_{10} Emission Factors from Unpaved Roads in Arizona to Determine the Efficiency of Dust Suppressants

Products Previously Discussed

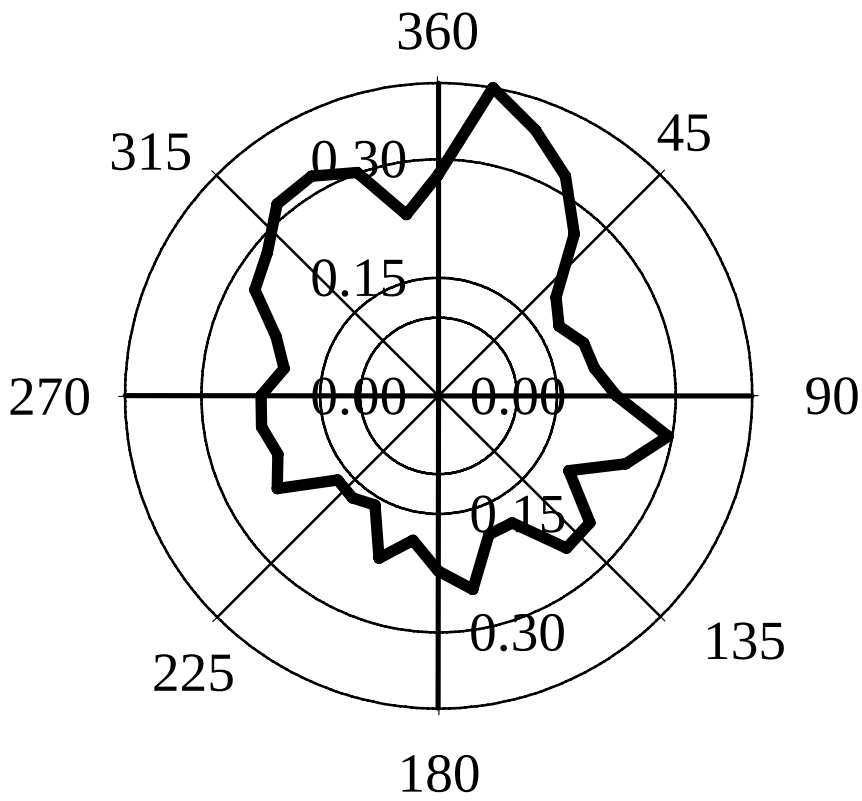
- Projected Change in Ozone Precursors
- Spreadsheet Model for Computing PM_{10} Impacts from Unpaved Road Travel

Blueprint for Development of PM_{10} Attainment Plan

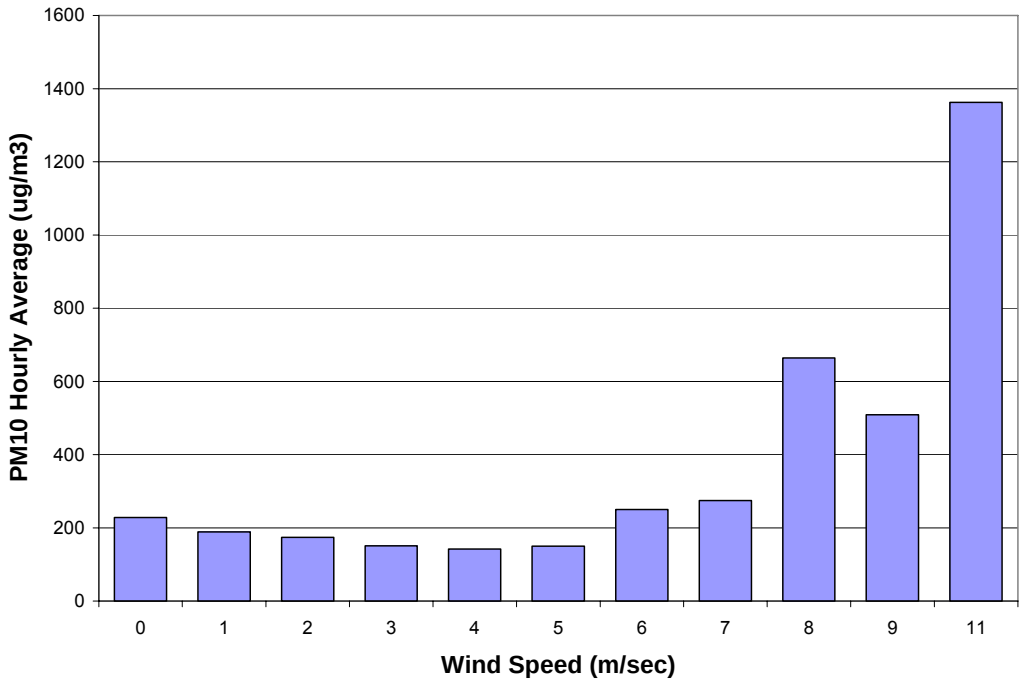
Average Hourly PM_{10} vs. Wind Speed Pinal County Housing Complex, 2005



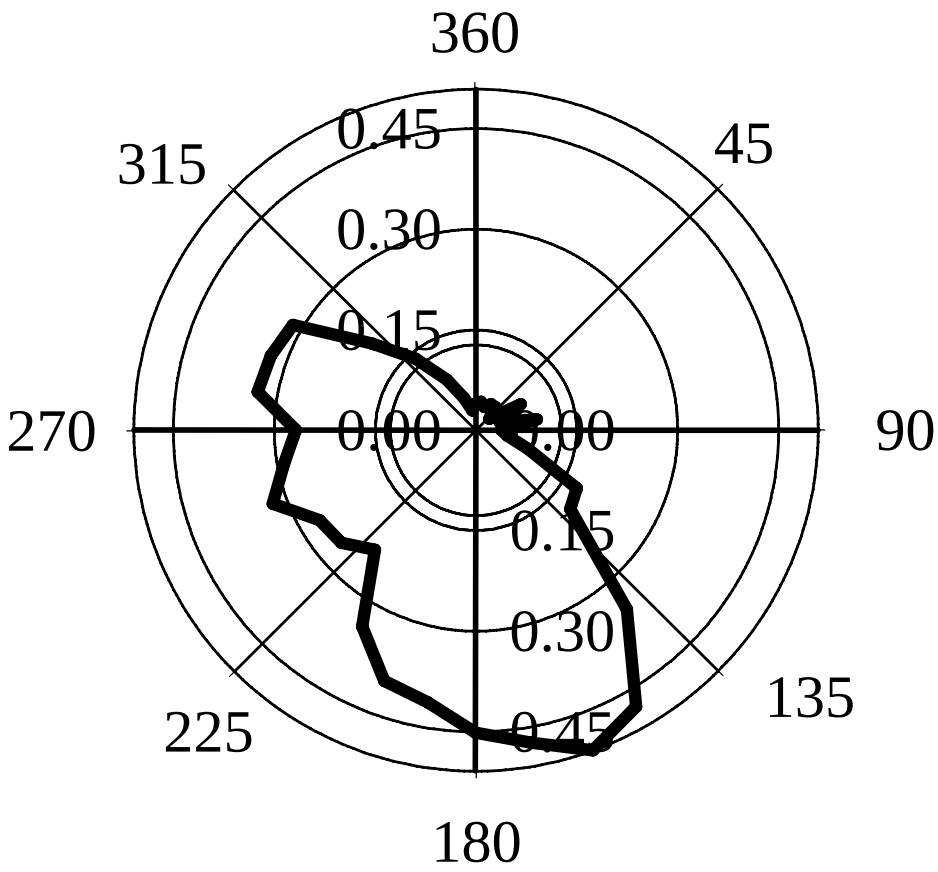
High PM_{10} Probability by Wind Direction Sector Pinal County Housing Complex, 2005



Average Hourly PM_{10} vs. Wind Speed Cowtown, 2005



High PM_{10} Probability by Wind Direction Sector Cowtown



Task 5 Prepare PM_{10} Attainment Plan Blueprint

Findings

- Monitoring data indicate only 1 or 2 PM_{10} stations that satisfy EPA siting criteria violate federal ambient air quality standards
- The emission inventory shows that 86% of PM_{10} emissions are generated by area sources such as unpaved road use, agricultural tilling, and construction

Task 5 Prepare PM_{10} Attainment Plan Blueprint

Findings

- No emission inventory system will forecast trends in 24-hour average PM_{10} concentrations in areas where fugitive dust sources predominate
- Additional studies, such as microinventory modeling, are needed to estimate the levels of controls necessary to attain PM_{10} standards

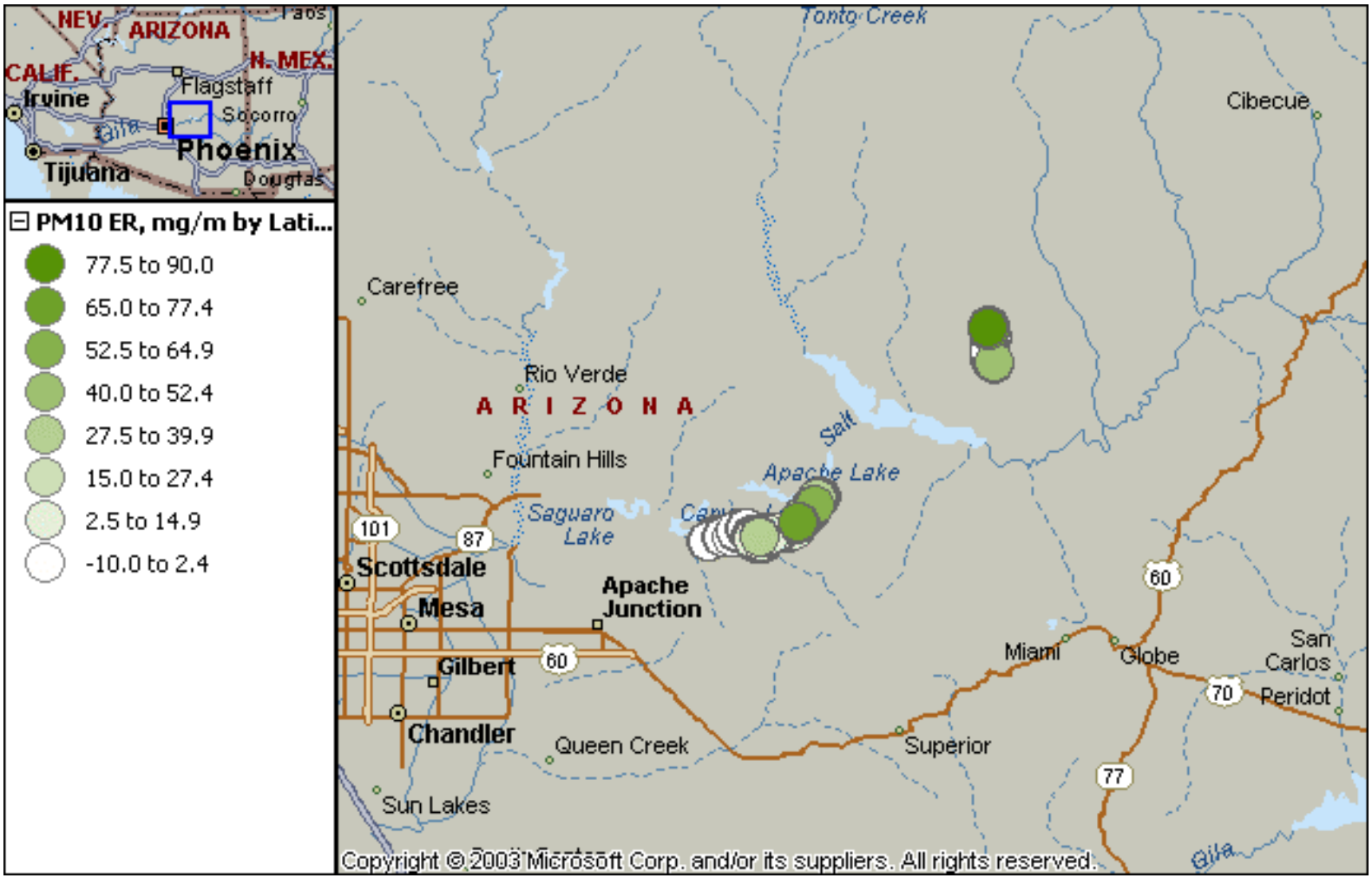
Task 5 Prepare PM10 Attainment Plan Blueprint

Findings

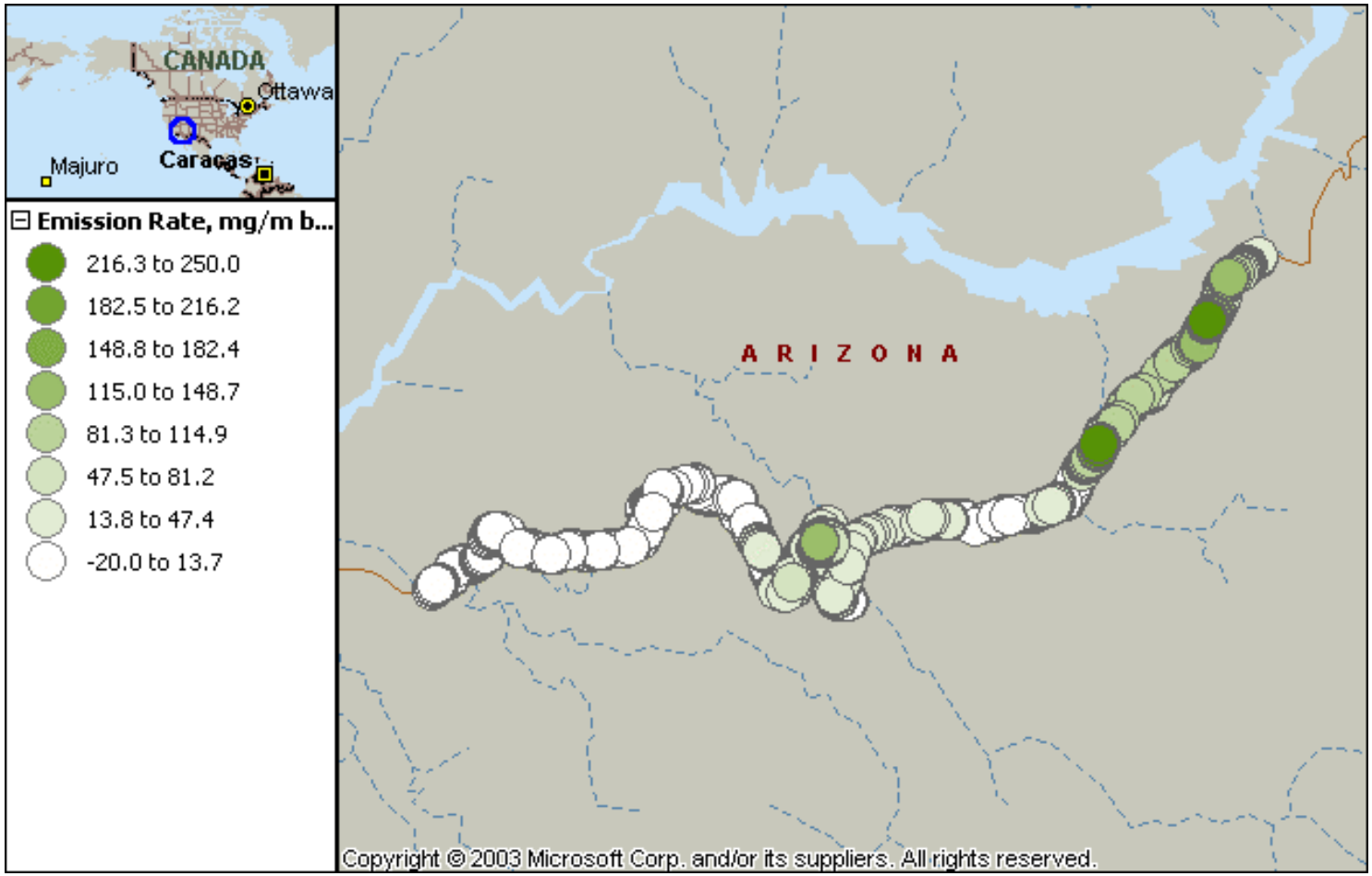
- If EPA chooses to exempt areas in which rural dust sources dominate the emission inventory from compliance with PM_{coarse} ambient standards, Pinal County will be obligated to use other public health goals as a basis for the regulation of local fugitive dust sources

Measurements of PM_{10} Emission Factors from Unpaved Roads in Arizona to Determine the Efficiency of Dust Suppressants

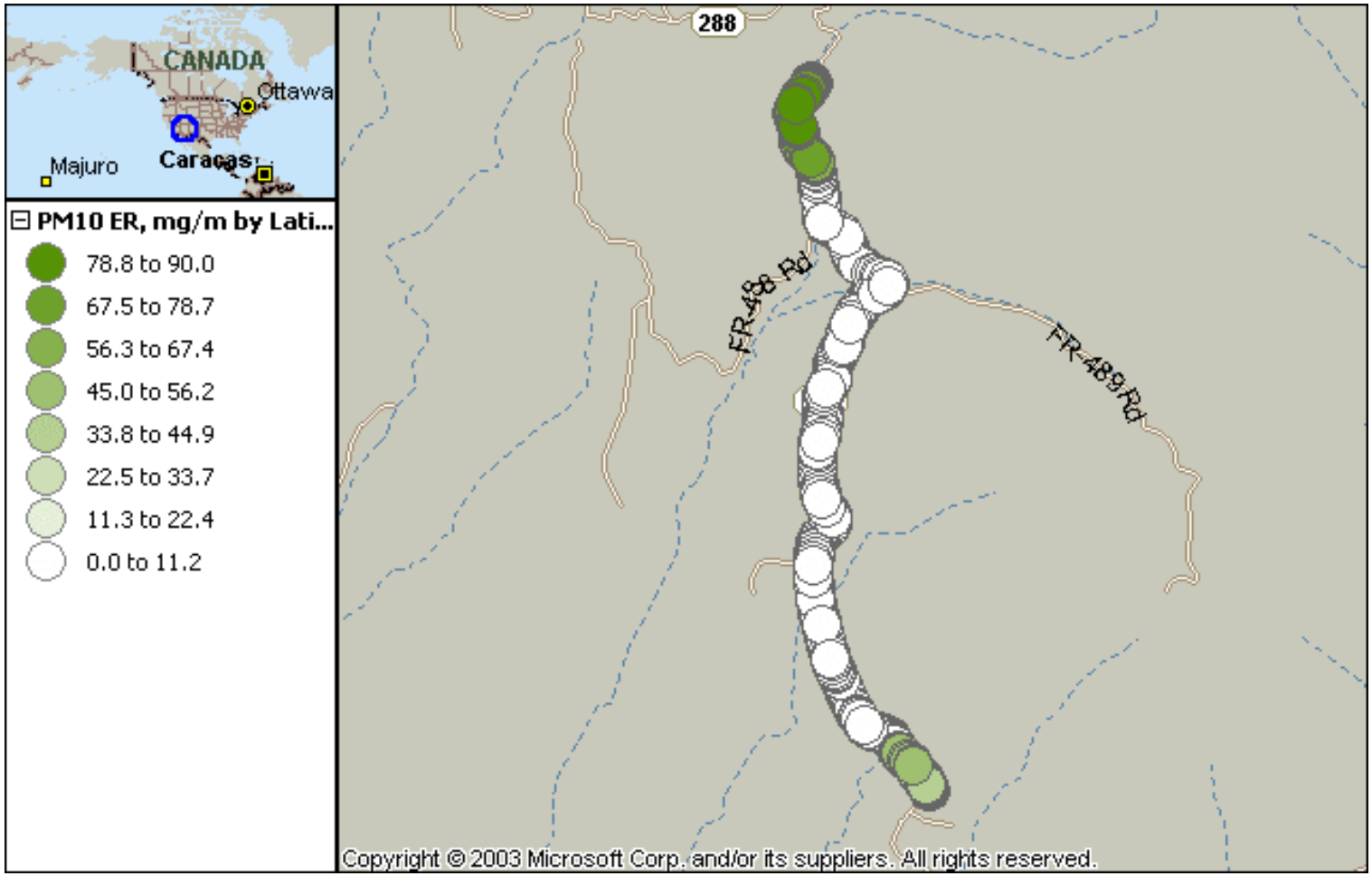
Map of the Test Segments Used on SR88 and SR188



Map of the Test Segments Used on SR88

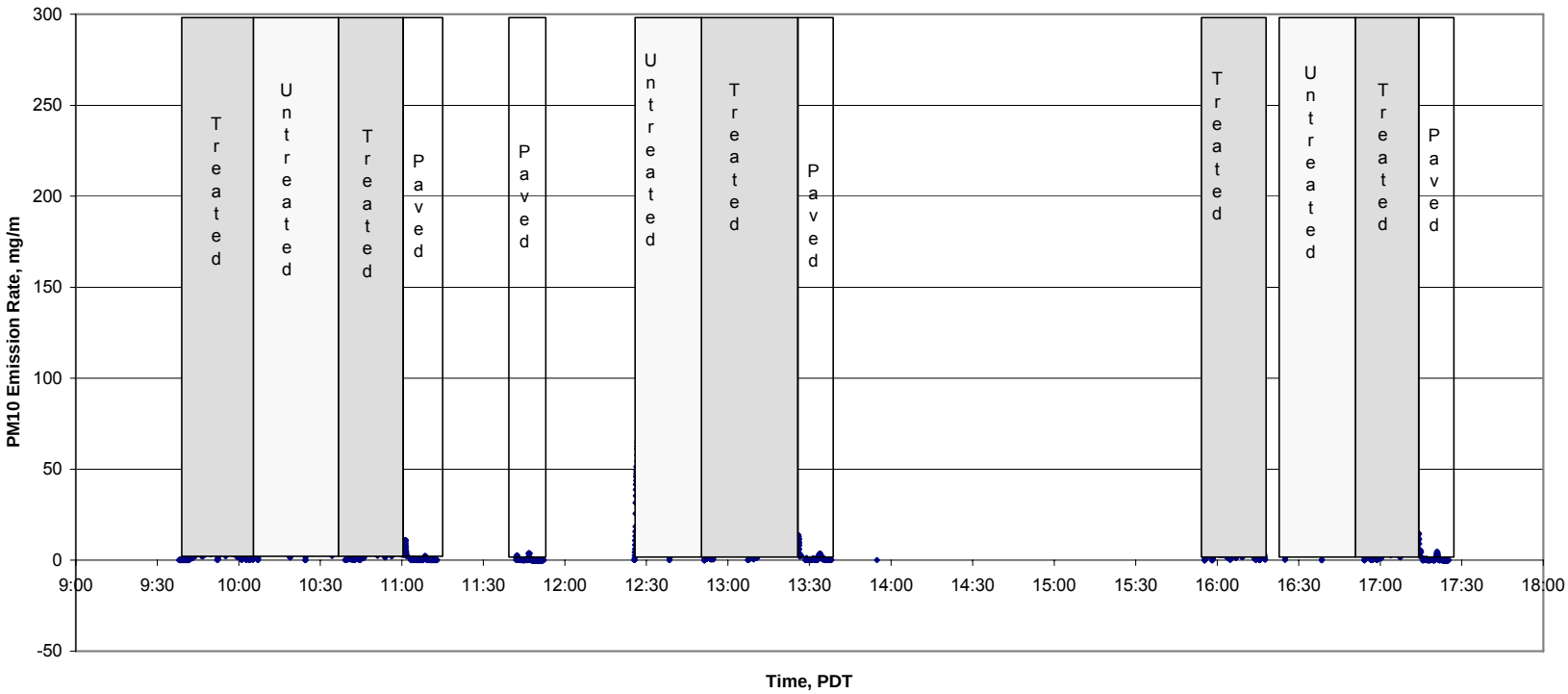


Map of the Test Segments Used on SR188

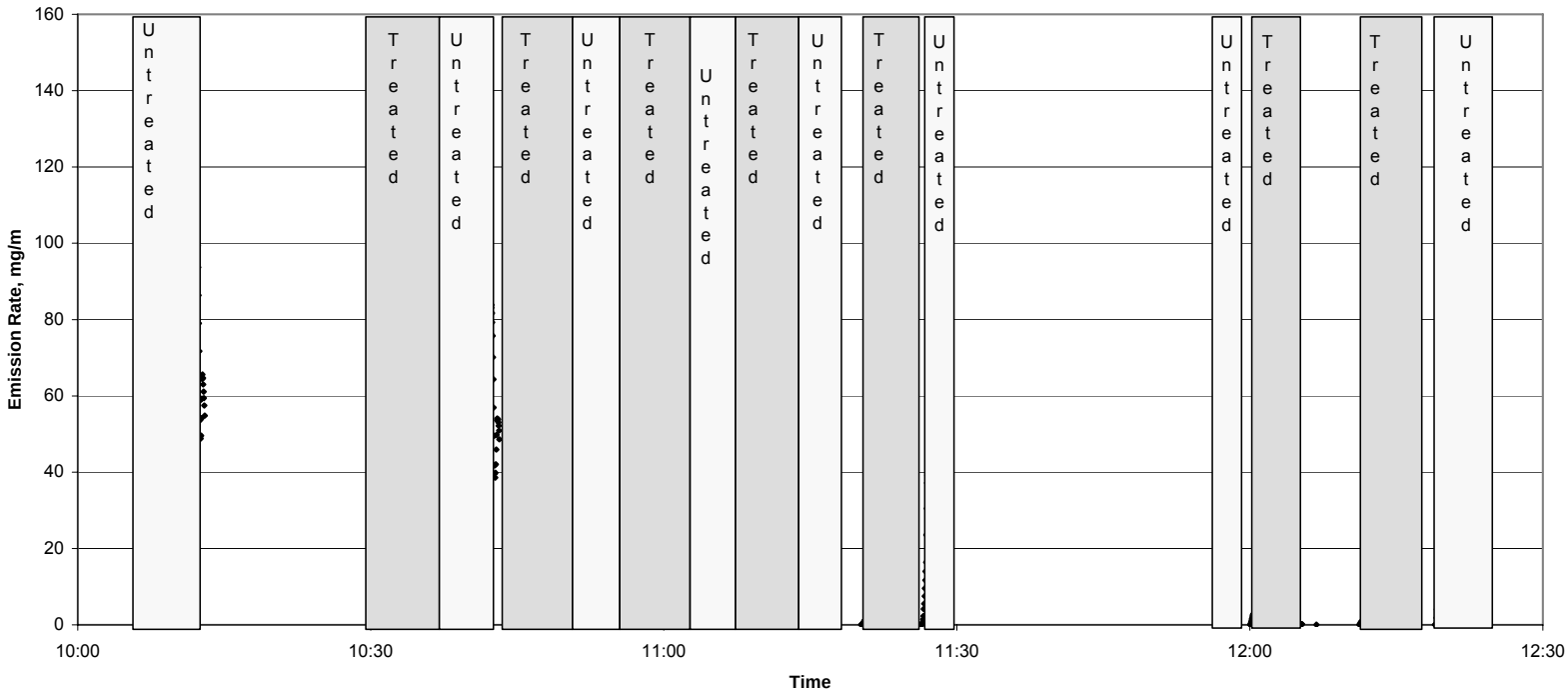


Photograph of the SCAMPER Testing SR88

Time Series Plot of PM_{10} Emissions During the Test Conducted on SR88 October 10, 2005



Time Series Plot of PM_{10} Emissions During the Test Conducted on SR188 October 11, 2005

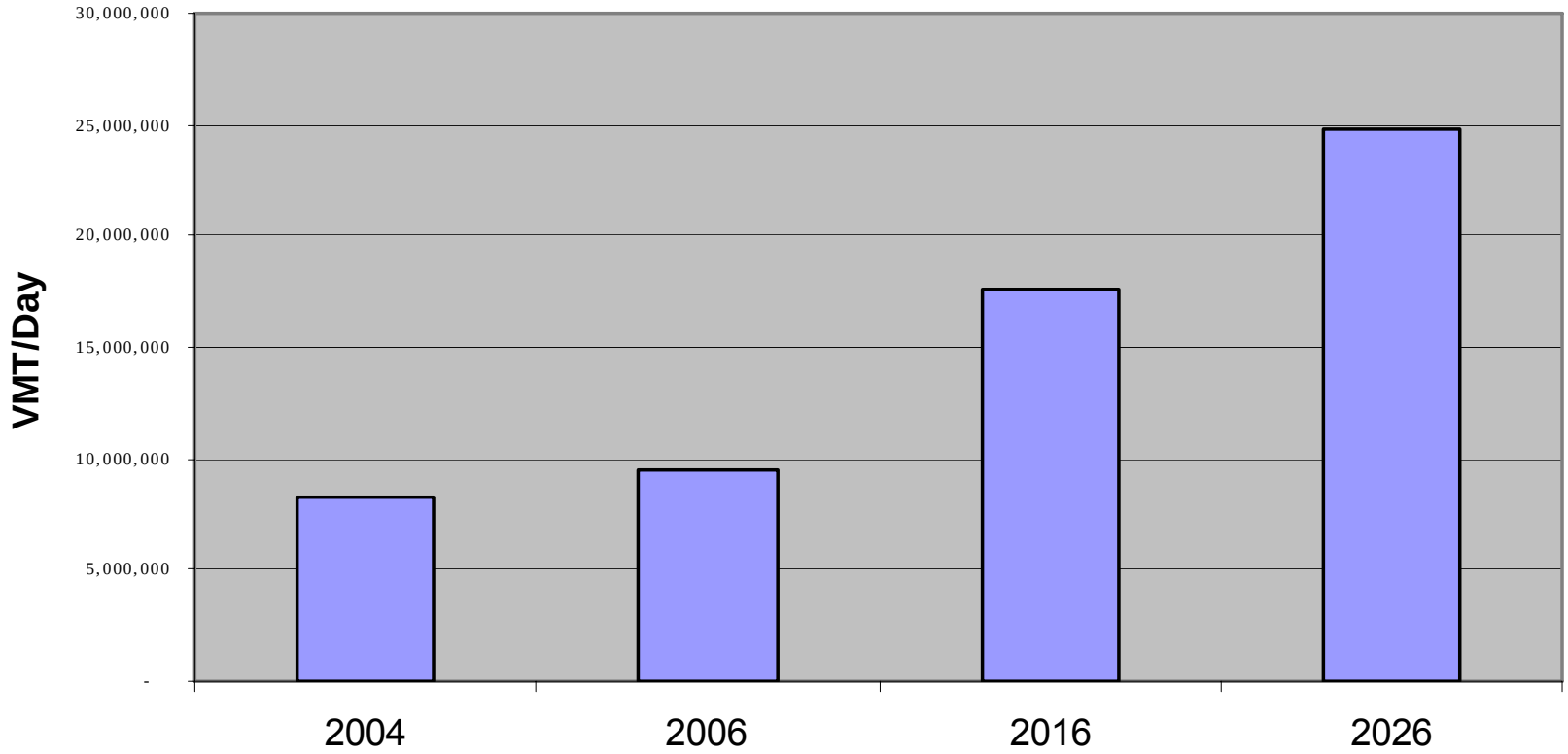


Conclusions

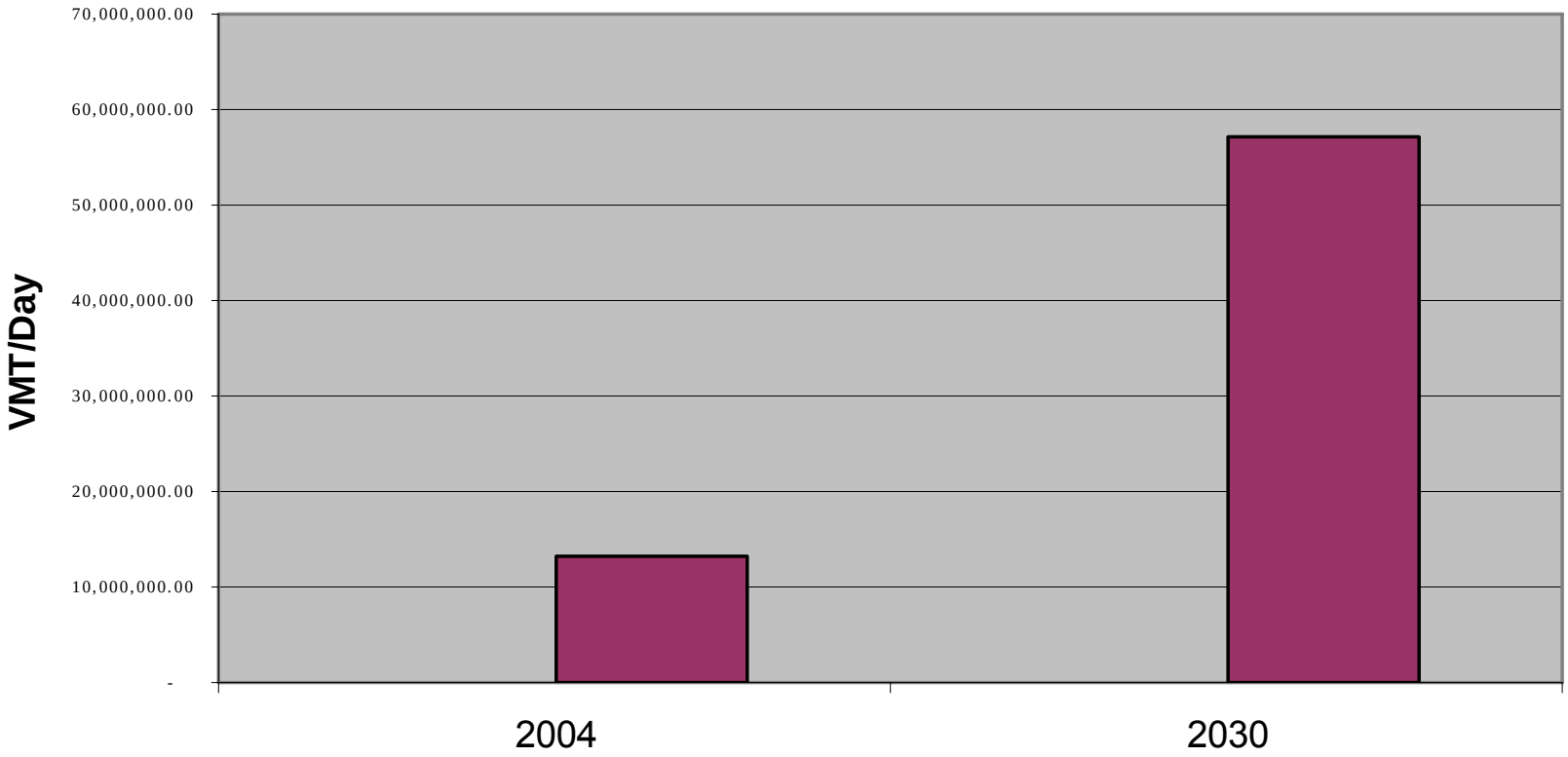
- The portion of SR88 treated with an acrylic copolymer in 2003 and 2005 measured 81% control efficiency
- The portion of SR188 treated with 6” base and emulsified asphalt sealant in September 2004 measured 98% control efficiency

Projected Change in Ozone Precursors

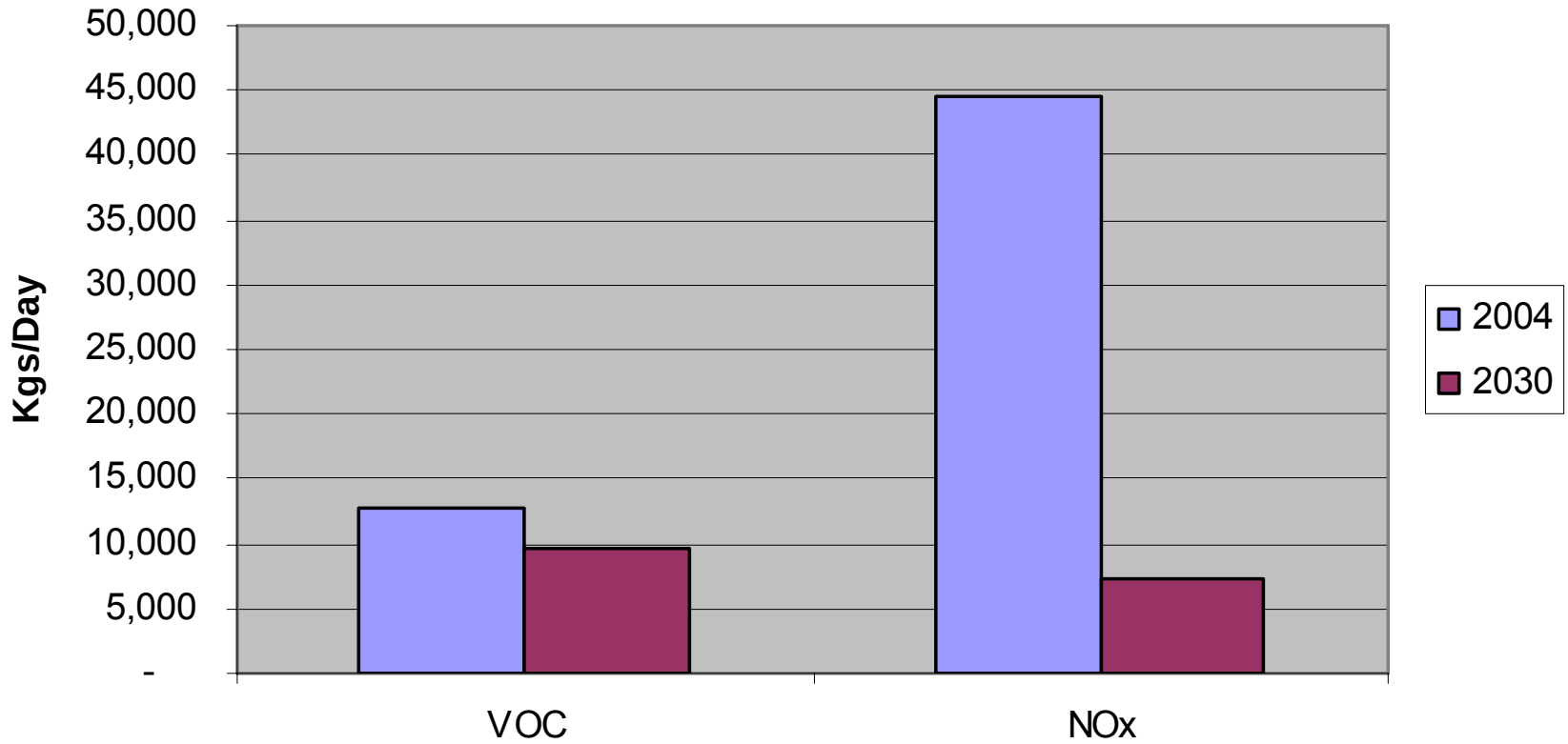
Estimated Growth in Travel based on MAG Forecast



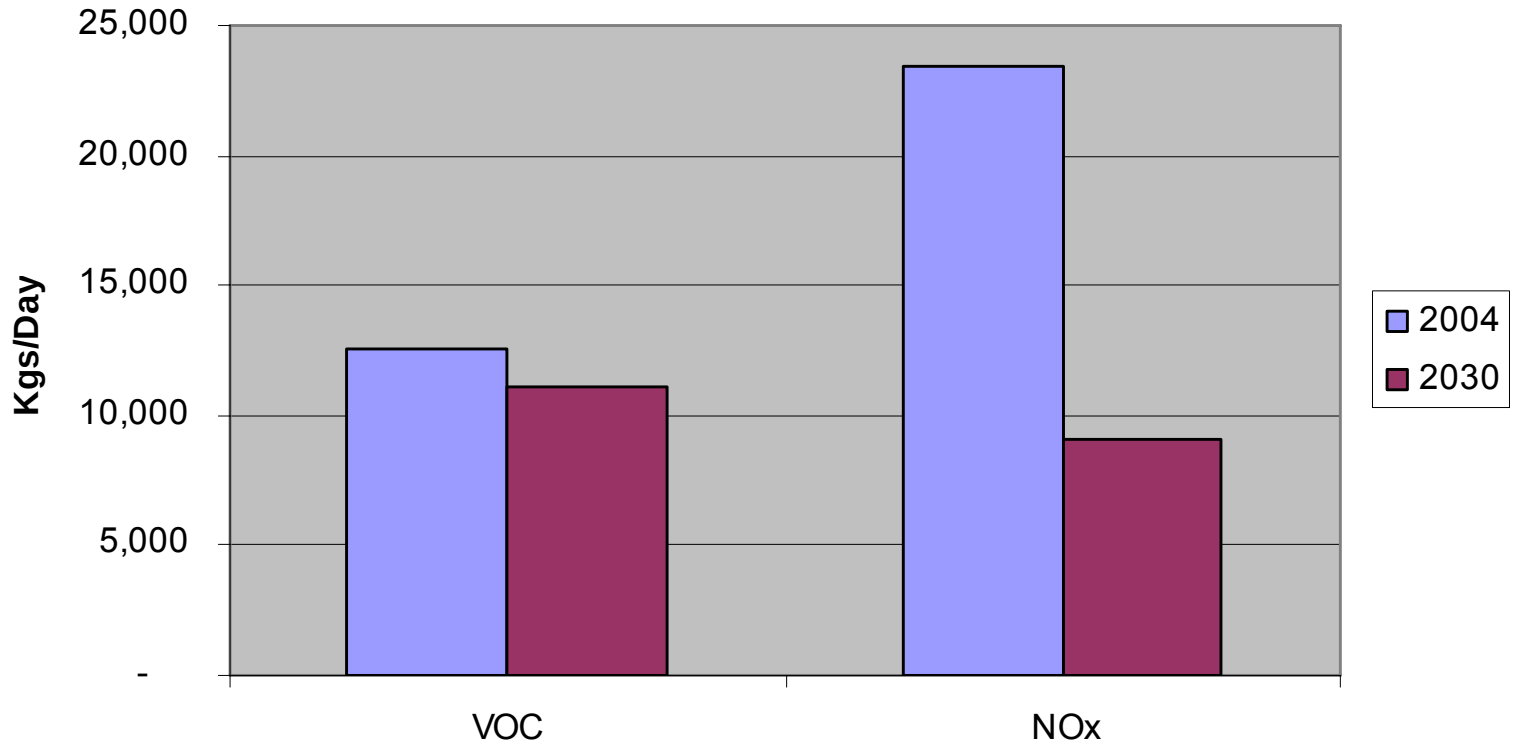
Estimated Change in Travel based on PCPM Forecast



Estimated Mobile Source Pollutant Emissions in Pinal County Based on PCPM Forecasts and Donut Area Rates



Estimated Mobile Source Pollutant Emissions in Pinal County Based on PCPM Forecasts and 8-Hour Non-Attainment Area Rates



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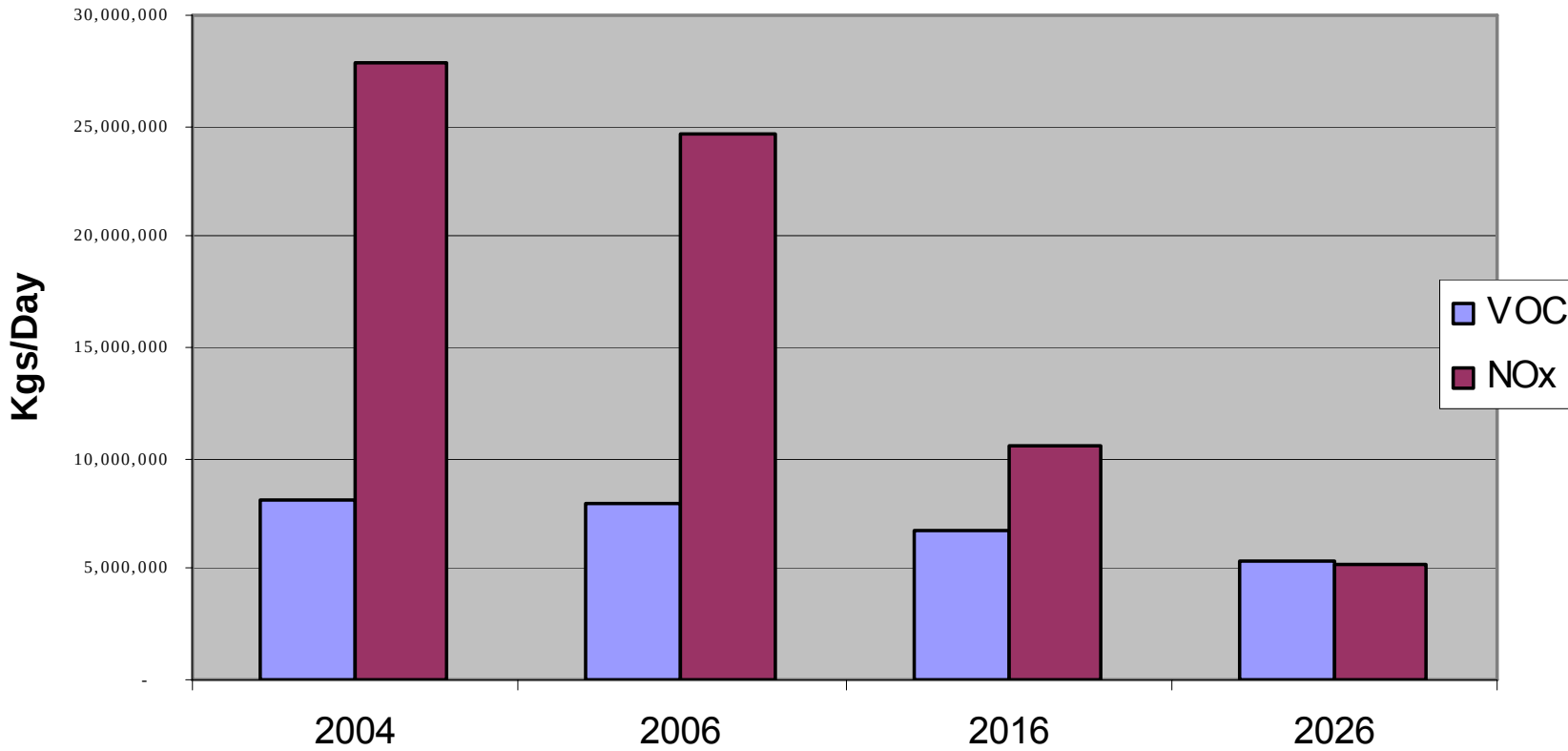

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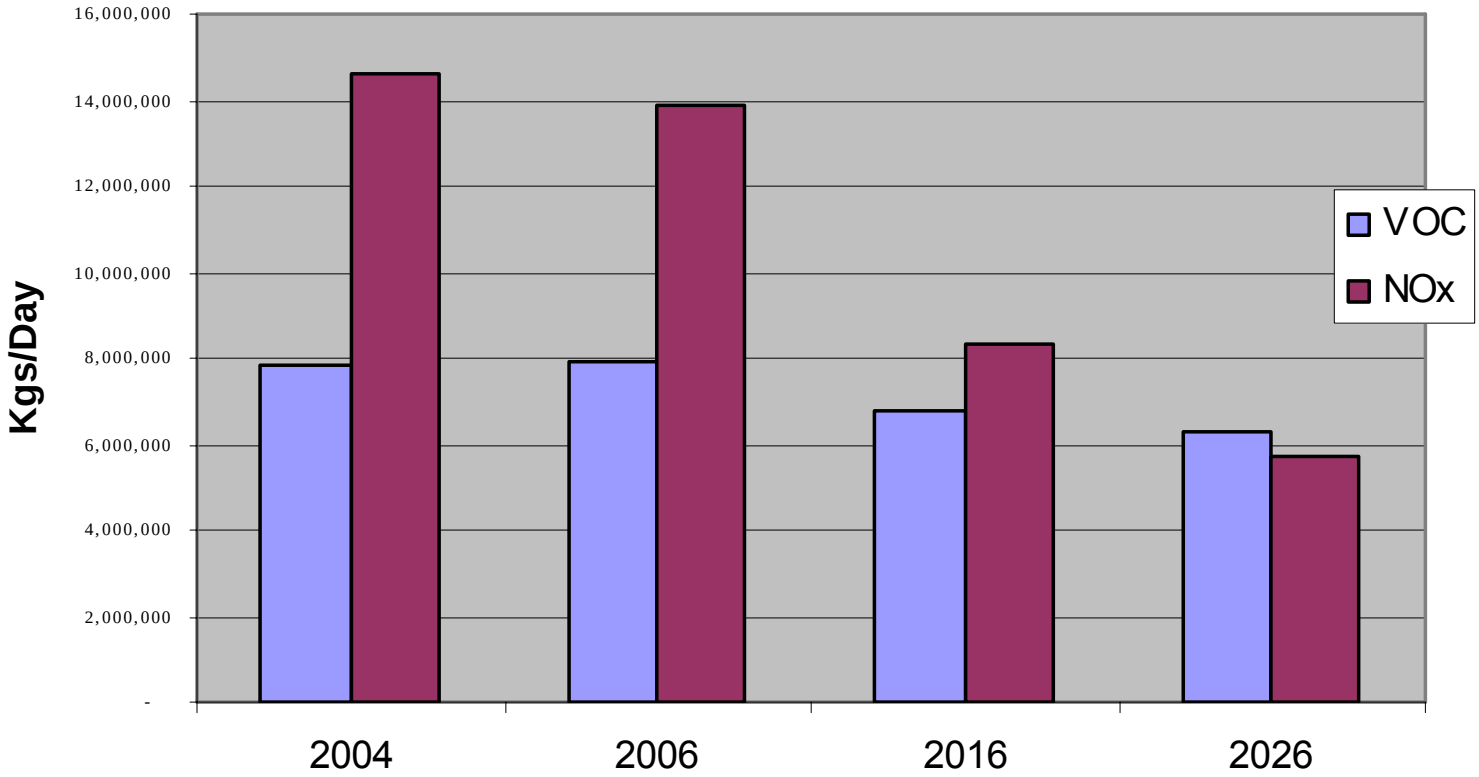
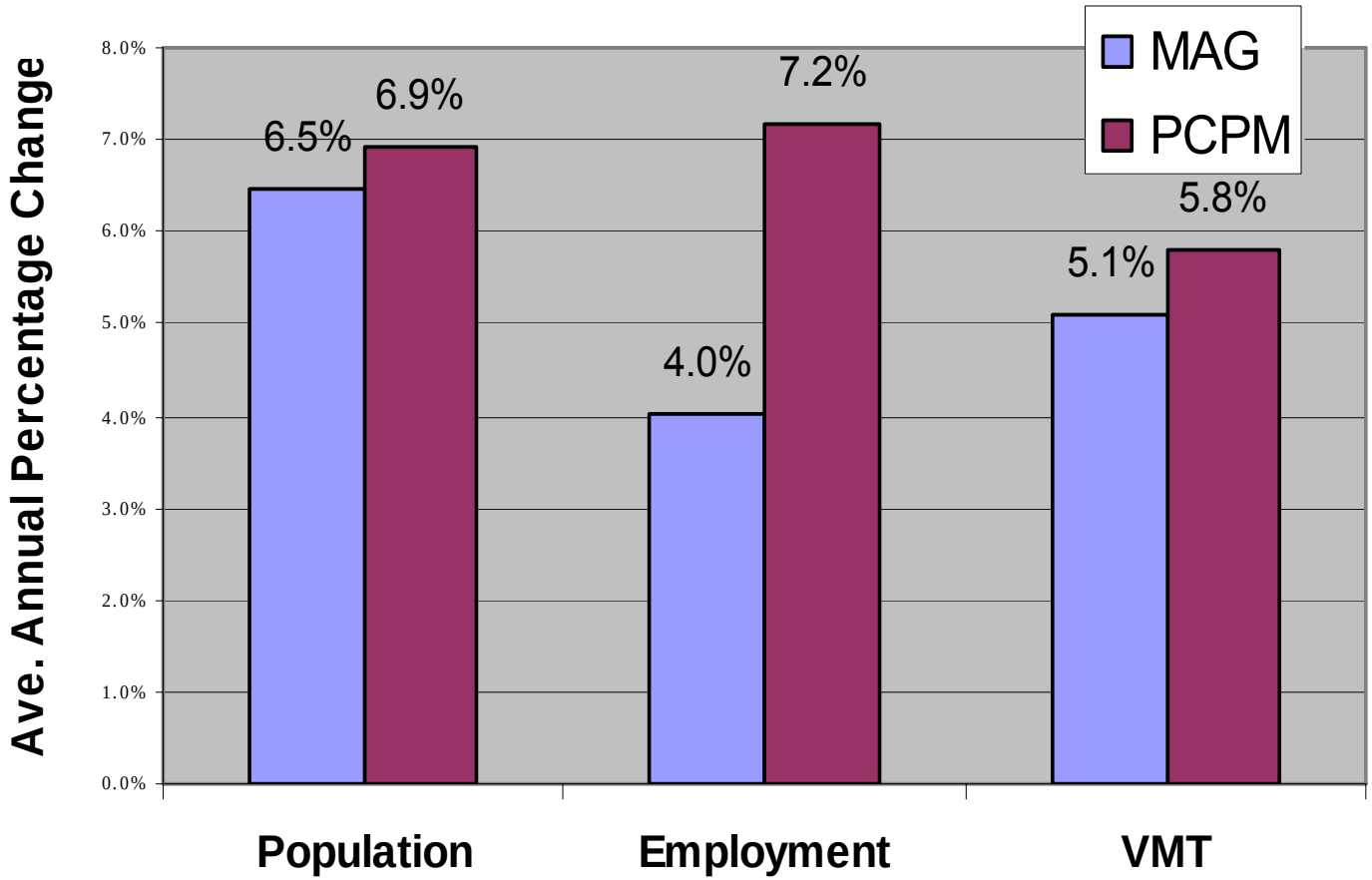
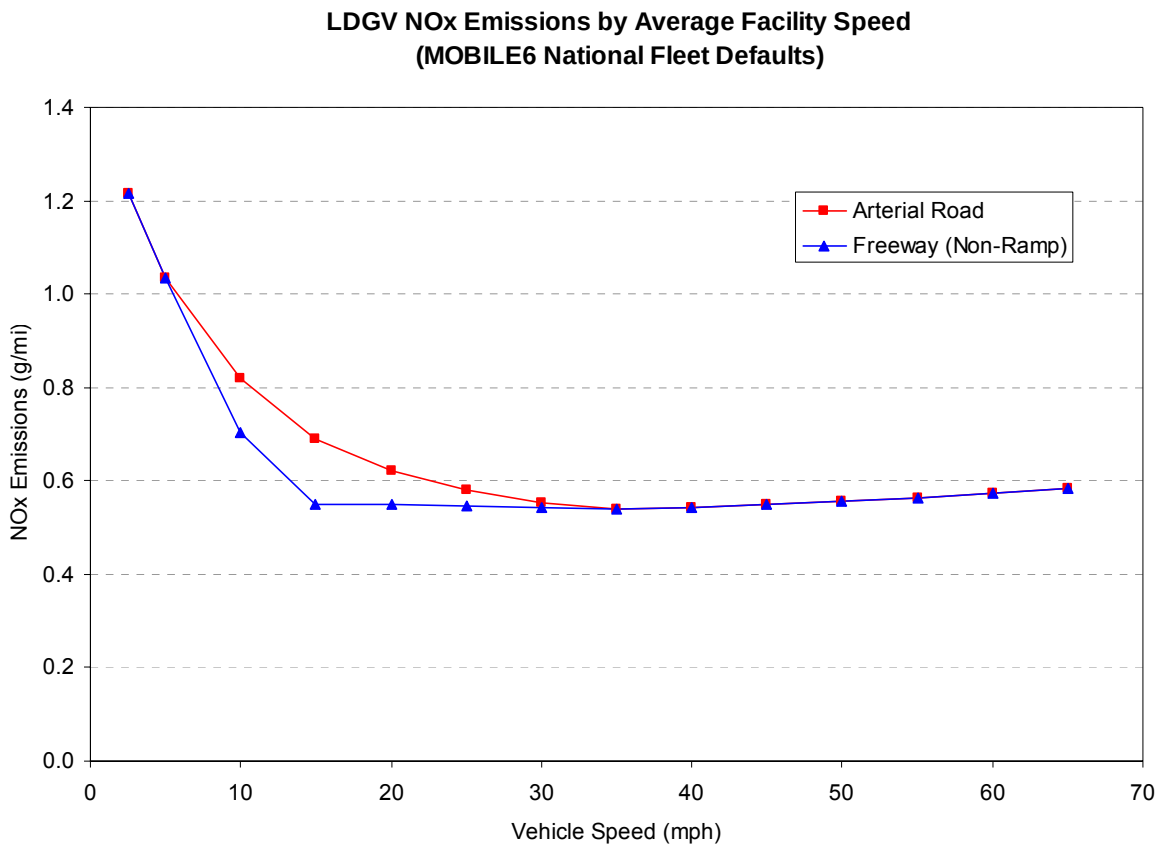


Comparison of Growth Rates with Emission Rate Reductions:

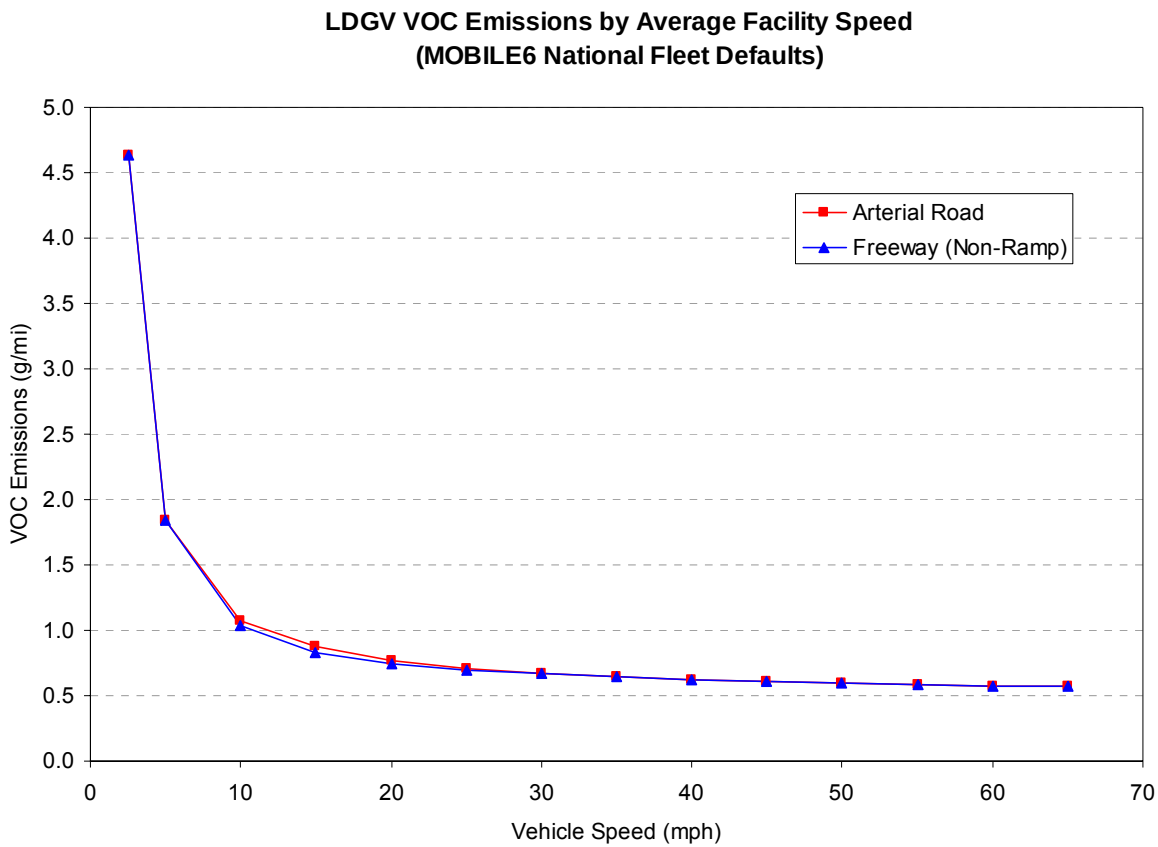
VOC: 5.8 - 6.5%/year NO_x: 8.9-11.9%/year



Relationship of NO_x Emission Rates to Average Facility Speed



Relationship of VOC Emission Rates to Average Facility Speed



Conclusions about Ozone Precursor Emissions

- Growth in travel will be dramatic in Pinal County
- The nature of travel in Pinal County will change – more internal travel and a lower share of heavy-duty vehicles in the fleet mix
- Average emission rates for VOC and NO_x will drop
- Total emissions of VOC and NO_x will almost certainly be lower in twenty years

Spreadsheet Model for Computing PM_{10} Impacts from Unpaved Road Travel

EPA Emission Equation for Unpaved Road Use

$$E = \frac{k\,(s/12)^{a}\,(S/30)^{b}}{(M/0.5)^{c}} - C$$

where: E = size-specific emission factor (lb/VMT)

s = surface material silt content (%)

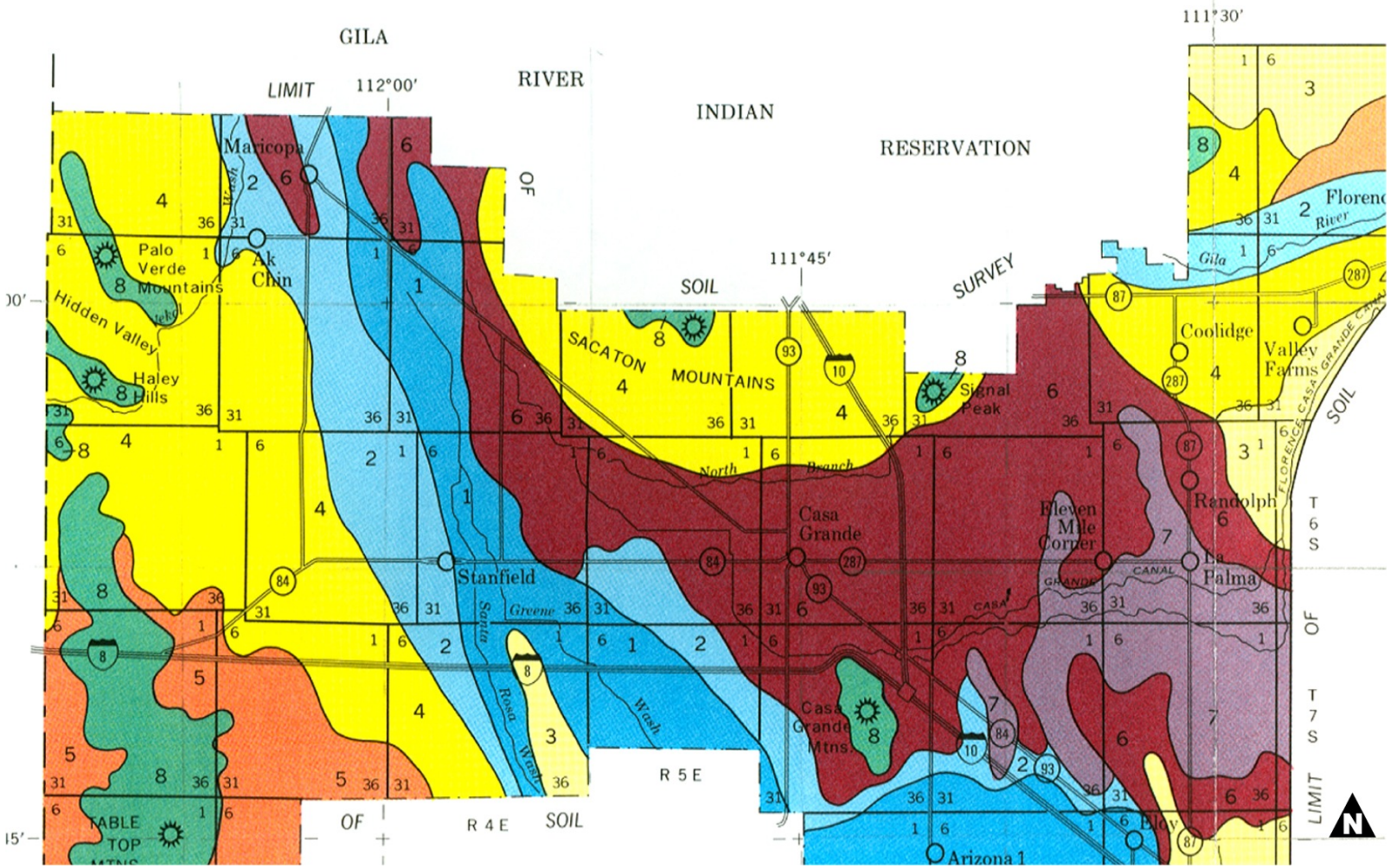
S = mean vehicle speed (mph)

M = surface material moisture content (%)

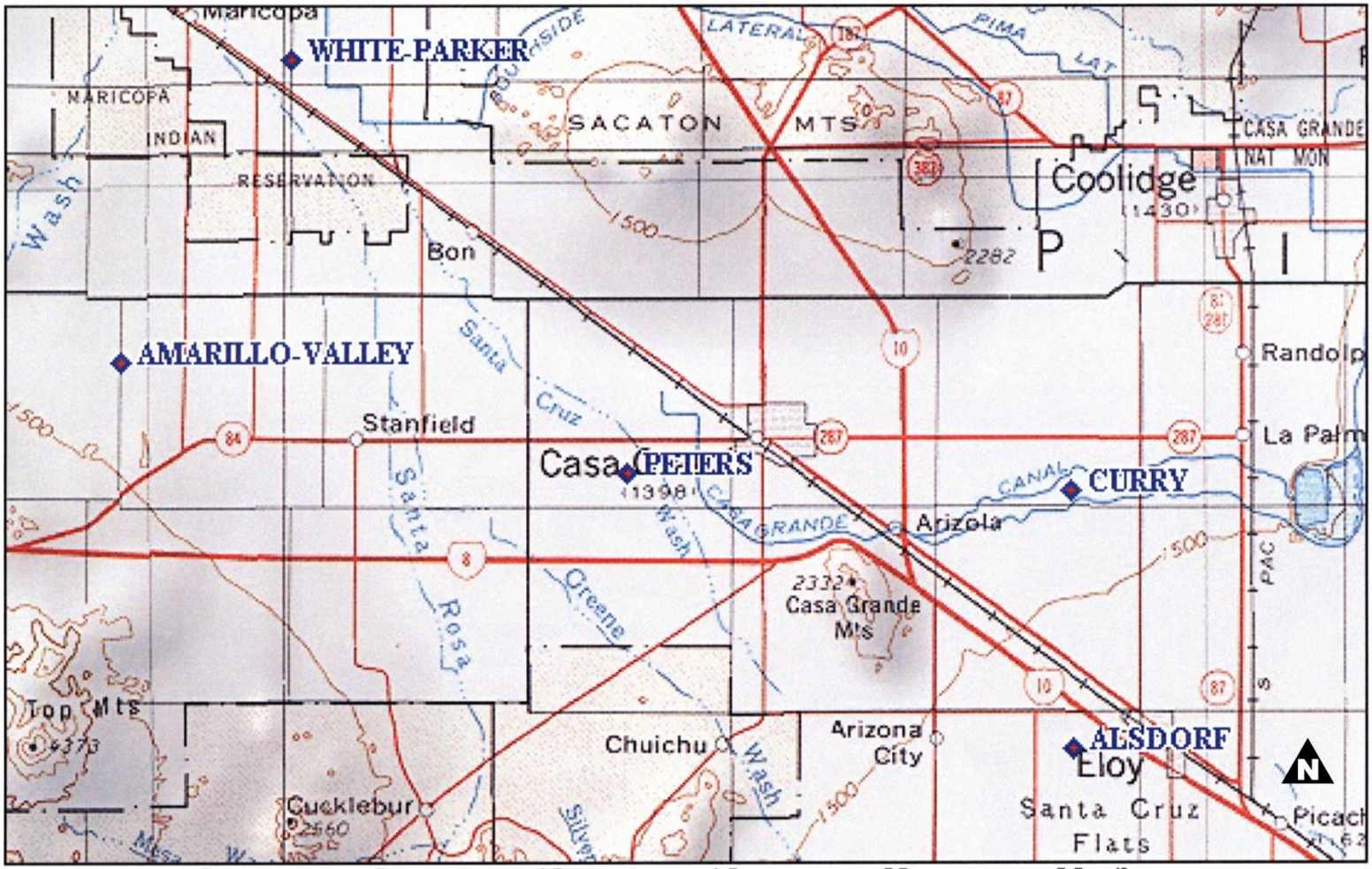
C = emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear

= 0.00047 lb/VMT for PM_{10}

General Soil Map of Western Pinal County



Location of Unpaved Road Traffic Counters



Next Steps

- Respond to TAC Comments on Products
- Prepare Final Documents